FRIEDRICH-ALEXANDER UNIVERSITÄT ERLANGEN-NÜRNBERG
SCHOOL OF BUSINESS, ECONOMICS AND SOCIETY

ESG rating events and stock market reactions

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Motivation and contributions

Motivation

- Growing importance of ESG ratings for investment decisions
- Discussion about impact of sustainable behavior of firms on stock returns
- ESG linked to risk-reducing properties

Contributions

I. How do ESG rating events affect stock returns?

→Negative stock market reaction to downgrades in E and S scores

→***ESG rating changes reveal new value-relevant information***

II. How do ESG rating events affect stock risks?

→Upgrades in E (G) scores can mitigate downside (systematic) risks

→***ESG rating upgrades materialize quickly and mitigate value-relevant risks in short-term***

ESG rating events and new value-relevant information

ESG rating process

ESG data:
- Unstructured
- Qualitative
- Extensive

ESG Rating provider
Transformation

ESG ratings:
- Quasi-quantitative
- Comparable
- Industry-adjusted

Creation of new value-relevant information

- Transformation of unstructured ESG data by ESG rating providers
- Industry-adjusted ratings allow comparison of firms
- Validation of materiality of ESG information

Clearer picture of ESG profile and future prospects

Change in ESG rating

Stock market reaction

Valuation channels of ESG rating events

Incorporation of ESG rating information in valuation channels

$$\text{Firm value (DCF model)} = \frac{\text{Expected cash flows}}{\text{Cost of capital}}$$

Expected cash flows

- Rating upgrade:

→ Signal of competitive advantage

- Rating downgrade:

→ Erosion of competitiveness

Company-specific risk

- Rating upgrade:

→ Reduction of downside risks (‘insurance-like properties’)

- Rating downgrade:

→ Higher probability of tail risks

Systematic risk

- Rating upgrade:

→ Lower market beta and cost of capital

- Rating downgrade:

→ Higher market beta and cost of capital

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Main hypotheses

(I) ESG rating events and stock returns

H_a: Stock markets react positively to rating upgrades in value-relevant pillars

H_b: Stock markets react negatively to rating downgrades in value-relevant pillars

(II) ESG rating events and stock risks

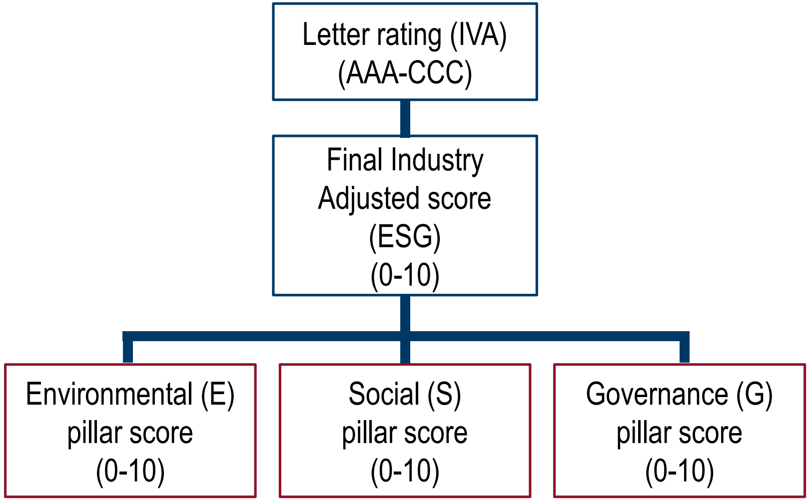
H_a: ESG rating upgrades have a mitigating effect on downside, idiosyncratic, systematic and total risk

H_b: ESG rating downgrades have an increasing effect on downside, idiosyncratic, systematic and total risk

ESG ratings and stock data

ESG ratings

- MSCI IVA
- Focus on aggregate industry adjusted scores (IVA and ESG) and pillar scores (E, S and G)



General sample characteristics

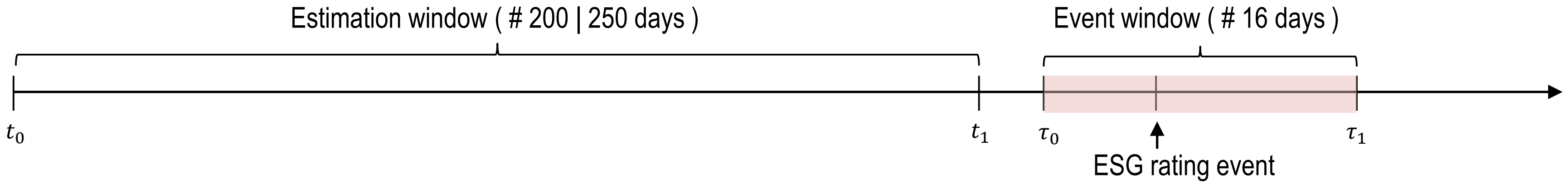
- US sample
- 9,824 rating events
- Rating events between 02/2007 and 12/2018

Stock data

- Price and Total Return data retrieved from Refinitiv Datastream
- Firm variables retrieved from Refinitiv Workspace
- Factor returns from Kenneth French’s data library

Empirical methodology for abnormal return analysis

Event-study analysis



Estimation of coefficients

- 1-factor model
- 6-factor model

Estimation of abnormal returns (AR)

$$AR_{i,\tau} = er_{i,\tau} - E(er_{i,\tau})$$

Event-study results (CAR)

	IVA	ESG	E	S	G
Panel A: CAAR [-5,-1]					
1-factor model					
(-)	0.35%	0.32%	0.30%	0.32%	0.25%
	(1.71)	(1.24)	(0.79)	(1.39)	(1.11)
(0)	0.06%	0.04%	0.07%	0.07%	0.09%
	(0.4)	(0.28)	(0.45)	(0.51)	(0.61)
(+)	0.00%	0.13%	0.10%	0.00%	0.02%
	(-0.02)	(0.8)	(0.96)	(0.01)	(0.09)
6-factor model					
(-)	0.25%	0.23%	0.18%	0.20%	0.04%
	(1.23)	(0.71)	(0.07)	(0.65)	(-0.26)
(0)	-0.12%**	-0.14%**	-0.09%*	-0.09%*	-0.07%
	(-2.14)	(-2.35)	(-1.95)	(-1.81)	(-1.43)
(+)	-0.10%	0.04%	-0.01%	-0.12%	-0.04%
	(-1.05)	(0.03)	(0.36)	(-0.85)	(-0.82)
Panel B: CAAR [0,10]					
1-factor model					
(-)	-0.19%*	-0.23%*	-0.67%***	-0.41%***	-0.07%
	(-1.8)	(-1.7)	(-2.78)	(-2.65)	(-0.74)
(0)	-0.24%**	-0.23%**	-0.20%**	-0.20%	-0.24%**
	(-2.02)	(-2.08)	(-1.98)	(-1.58)	(-2.22)
(+)	-0.11%	-0.09%	0.11%	-0.07%	-0.15%
	(-0.96)	(-0.79)	(0.34)	(-1.13)	(-0.91)
6-factor model					
(-)	-0.02%	-0.07%	-0.66%***	-0.36%**	0.15%
	(-0.77)	(-0.78)	(-2.84)	(-2.31)	(0.05)
(0)	0.00%	0.00%	0.07%	0.07%	-0.01%
	(-0.56)	(-0.72)	(-0.22)	(0.33)	(-0.82)
(+)	0.02%	0.08%	0.15%	0.01%	-0.02%
	(-0.06)	(0.28)	(0.95)	(-0.61)	(-0.13)

Main findings

- No anticipation effects
- Asymmetric reactions to rating up- and downgrades
- Significant negative abnormal returns for downgrades
  → CAAR[0,10] of -0,67% (E) and -0,41% (S)

Especially rating downgrades carry value-relevant information

Explanations

- Distinct nature of ESG news
- Negativity effect (Rozin & Royzman, 2001)
- Sustainable investment strategies

Difference-in-Differences framework (DiD)

DiD-Regressions

$$Risk\ measure_{i,t} = \alpha + \beta_1 Treatment_i \times Post_{i,t} + \beta_2 Treatment_i + \beta_3 Post_{i,t} + \beta_4 FirmControls_{i,t} + Country\ FE + Year\ FE + \varepsilon_{i,t}$$

Key variables

- $Treatment_i = 1$, if $\Delta Rating \geq 1$ or $\Delta Rating \leq -1$

  $Treatment_i = 0$, if $-1 < \Delta Rating < 1$
- Observation period with 24 monthly risk observations

Interpretation of DiD-coefficient

- $\beta_1 < 0$ ➡ Risk mitigation
- $\beta_1 > 0$ ➡ Risk increase

Control firms: Matching via Propensity Score (PS)

- PS reflects probability of being treated (Rating up- or downgrade)
- Estimation of PS via Probit-Regression
- Five-Nearest-Neighbor-Matching with exact industry-match

Rating upgrades and stock risks (DiD)

	IVA	ESG	E	S	G
Panel A: VaR					
Treatment x Post	-0.0007**	-0.0007**	-0.0011***	-0.0002	0.0003
	(-2.28)	(-2.51)	(-2.76)	(-0.61)	(0.39)
Treatment	0.0002	0.0000	0.0003	-0.0003	-0.0005
	(0.86)	(-0.11)	(0.93)	(-0.87)	(-1.06)
Post	0.0004	0.0004**	-0.0003	-0.0002	-0.0013**
	(1.55)	(2.07)	(-0.86)	(-0.58)	(-2.13)
Adj. R^2	0.2147	0.2092	0.2358	0.2303	0.2618
Obs.	103,569	103,426	76,574	88,283	53,130
Panel B: Market Beta					
Treatment x Post	-0.0154	-0.0107	0.0154	0.0072	-0.0410***
	(-1.42)	(-0.97)	(1.19)	(0.55)	(-2.96)
Treatment	-0.0014	0.0013	0.0068	0.0095	0.0278*
	(-0.13)	(0.11)	(0.51)	(0.75)	(1.76)
Post	-0.0055	-0.0108	-0.0237***	-0.0154**	0.0204**
	(-0.79)	(-1.55)	(-3.01)	(-2)	(2.03)
Adj. R^2	0.3589	0.3426	0.3337	0.3484	0.3888
Obs.	8,632	8,620	6,382	7,358	4,428
Panel C: Volatility					
Treatment x Post	-0.0002	-0.0003*	-0.0009***	-0.0001	0.0002
	(-1.14)	(-1.65)	(-3.35)	(-0.54)	(0.5)
Treatment	0.0000	-0.0001	0.0003	-0.0002	-0.0004
	(0.08)	(-0.57)	(1.16)	(-1.03)	(-1.16)
Post	0.0000	0.0001	-0.0002	-0.0001	-0.0009**
	(0.16)	(0.97)	(-0.85)	(-0.69)	(-2.44)
Adj. R^2	0.2460	0.2415	0.2669	0.2579	0.2920
Obs.	103,569	103,426	76,574	88,283	53,130
Firm controls	Yes	Yes	Yes	Yes	Yes
Matched sample	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Main findings

- Upgrades in IVA, ESG and E scores mitigate downside risk
- Upgrades in G scores moderate systematic risk
- Upgrades in E scores mitigate overall risk

Rating upgrades materialize quickly and unfold risk moderating effect

Rating downgrades and stock risks (DiD)

	IVA	ESG	E	S	G
Panel A: VaR					
Treatment x Post	-0.0004	-0.0006	-0.0004	-0.0009***	0.0003
	(-1.3)	(-1.62)	(-0.84)	(-2.58)	(0.7)
Treatment	0.0011***	0.0007**	0.0001	0.0009***	0.0007
	(3.52)	(2.4)	(0.24)	(2.97)	(1.52)
Post	-0.0001	0.0000	-0.0015***	-0.0002	-0.0018***
	(-0.25)	(0.07)	(-4.57)	(-0.6)	(-4.11)
Adj. R^2	0.2325	0.2254	0.2320	0.2095	0.2541
Obs.	83,871	84,351	62,151	76,070	50,326
Panel B: Market Beta					
Treatment x Post	0.0130	-0.0047	0.0083	0.0024	-0.0218
	(1.01)	(-0.36)	(0.57)	(0.2)	(-1.46)
Treatment	0.0183	0.0217*	0.0006	0.0108	0.0401**
	(1.44)	(1.71)	(0.04)	(0.86)	(2.47)
Post	-0.0140*	-0.0082	0.0292***	0.0055	-0.0276***
	(-1.77)	(-1.05)	(3.49)	(0.7)	(-2.82)
Adj. R^2	0.3291	0.3376	0.3626	0.3391	0.3664
Obs.	6,990	7,030	5,180	6,340	4,194
Panel C: Volatility					
Treatment x Post	-0.0002	-0.0002	-0.0001	-0.0006***	0.0003
	(-0.75)	(-0.89)	(-0.21)	(-2.59)	(0.93)
Treatment	0.0008***	0.0005**	-0.0002	0.0006***	0.0004
	(3.59)	(2.19)	(-0.73)	(2.83)	(1.23)
Post	-0.0001	-0.0001	-0.0009***	-0.0001	-0.0013***
	(-0.32)	(-0.53)	(-4.31)	(-0.67)	(-4.62)
Adj. R^2	0.2586	0.2506	0.2594	0.2379	0.2817
Obs.	83,871	84,351	62,151	76,070	50,326
Firm controls	Yes	Yes	Yes	Yes	Yes
Matched sample	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Main findings

- No significant risk increase
- Downgrades in S scores mitigate downside risk and volatility

  → <u>Possible explanation</u>:
  Differing implications for stakeholder and shareholders

Rating downgrades not necessarily accompanied by risk increase

Conclusion

Contribution & summary

- **ESG rating changes carry value-relevant information**
  → Significant negative stock market reaction to downgrades in E and S scores

- **ESG rating upgrades materialize quickly and mitigate value-relevant risks in short-term**
  → Upgrades in E scores can mitigate downside risks
  → Upgrades in G scores can moderate systematic risks